

SEQUENCE LISTING

<110> Ayyavoo, Velpandi
 Nagashunmugam, Thandavarayan
 Weiner, David B.
 University of Pennsylvania

<120> ATTENUATED VIF DNA IMMUNIZATION CASSETTES FOR GENETIC
 VACCINES

<130> UPAP-0263

<140> HEREWITH

<141> 1998-09-18

<160> 46

<170> PatentIn Ver. 2.0

<210> 1

<211> 190

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 1

Met Glu Asn Arg Trp Gln Val Met Ile Val Trp Gln Val Asp Arg Met

1

5

10

15

Arg Ile Arg Thr Trp Asn Ser Leu Val Lys His His Met Tyr Val Ser

20

25

30

Lys Lys Ala Arg Trp Phe Tyr Arg His His Tyr Glu Ser Pro His Pro

35

40

45

Lys Val Ser Ser Glu Val His Ile Pro Leu Gly Asp Ala Arg Leu Glu

50

55

60

Thr Thr Thr Tyr Trp Gly Leu His Gly Glu Arg Asp Trp His Leu Gly

65

70

75

80

Gln Gly Val Ser Ile Glu Trp Arg Lys Arg Arg Tyr Ser Thr Gln Val
85 90 95

Asp Pro Asp Leu Ala Asp Gln Leu Ile His Leu Tyr Tyr Phe Asp Cys
100 105 110

Phe Ser Glu Ser Ala Ile Arg Lys Ala Ile Leu Gly Tyr Arg Val Ser
115 120 125

Pro Arg Cys Glu Tyr Gln Ala Gly His Asn Lys Val Gly Ser Leu Gln
130 135 140

Tyr Leu Ala Leu Ala Ala Leu Ile Thr Pro Lys Lys Ile Lys Pro Pro
145 150 155 160

Leu Pro Ser Val Arg Lys Leu Thr Glu Asp Arg Trp Asn Lys Pro Gln
165 170 175

Lys Thr Lys Gly His Arg Gly Ser His Thr Met Asn Gly His
180 185 190

<210> 2

<211> 26

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 2

gaaagcttat ggaaaacaga tggcag 26

<210> 3

<211> 23

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 3

gcaaagcttt cattgtatgg ctc 23

<210> 4

gaaagcttat ggaaaacaga tggcag 26
gcaaagcttt cattgtatgg ctc 23

<211> 190

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 4

Met Glu Asn Arg Trp Gln Val Ile Ile Val Trp Gln Val Asp Arg Met
1 5 10 15

Arg Ile Arg Thr Trp Asn Ser Leu Val Lys Tyr His Met Tyr Ser Lys
20 25 30

Lys Ala Arg Glu Trp Phe Tyr His His Tyr Gln Ser Pro His Pro Lys
35 40 45

Val Ser Ser Glu Val His Ile Pro Leu Glu Asp Ala Arg Leu Glu Ile
50 55 60

Thr Ser Phe Trp Gly Leu His Thr Gly Glu Arg Asp Trp His Leu Gly
65 70 75 80

Gln Gly Val Ser Ile Glu Trp Arg Lys Arg Arg Tyr Ser Thr His Val
85 90 95

Asp Pro Asp Leu Ala Asp Gln Leu Ile His Leu Tyr Tyr Phe Asp Cys
100 105 110

Phe Ser Glu Ser Ala Ile Arg Lys Ala Ile Leu Gly His Arg Val Ser
115 120 125

Pro Arg Cys Glu Tyr Arg Ala Gly His Ser Lys Val Gly Ser Leu Gln
130 135 140

Tyr Leu Ala Ile Ala Ala Leu Ile Thr Pro Lys Lys Ile Lys Pro Pro
145 150 155 160

Leu Ala Ser Val Arg Lys Leu Thr Glu Asp Arg Trp Asn Lys Pro Gln
165 170 175

Lys Thr Lys Gly His Arg Gly Ser His Thr Met Asn Gly His
180 185 190

<210> 5

<211> 192

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 5

Met Glu Asn Arg Trp Gln Val Met Ile Val Trp Gln Val Asp Arg Met
1 5 10 15

Arg Ile Arg Thr Trp Asn Ser Leu Val Lys Tyr His Met Tyr Arg Ser
20 25 30

Lys Lys Ala Arg Glu Trp Phe Tyr Arg His His Tyr Gln Ser Pro His
35 40 45

Pro Arg Val Ser Ser Glu Val His Ile Pro Leu Glu Asp Ala Arg Leu
50 55 60

Glu Ile Thr Thr Tyr Trp Gly Leu His Thr Gly Glu Arg Asp Trp His
65 70 75 80

Leu Gly Gln Gly Val Ser Ile Glu Trp Arg Lys Arg Arg Tyr Ser Thr
85 90 95

Gln Val Asp Pro Asp Leu Ala Asp Gln Leu Ile His Leu Tyr Tyr Phe
100 105 110

Asp Cys Phe Ser Glu Ser Ala Ile Arg Lys Ala Ile Leu Gly His Arg
115 120 125

Val Ser Pro Arg Cys Glu Tyr Arg Ala Gly His Ser Lys Val Gly Ser
130 135 140

Leu Gln Tyr Leu Ala Ile Ala Ala Leu Ile Thr Pro Lys Lys Ile Lys
145 150 155 160

Pro Pro Leu Pro Ser Val Arg Lys Leu Thr Glu Asp Arg Trp Asn Lys
165 170 175

Pro Gln Lys Thr Lys Gly His Arg Gly Ser His Thr Met Asn Gly His
180 185 190

<210> 6

<211> 192

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 6

Met Glu Asn Arg Trp Gln Val Met Ile Val Trp Gln Val Asp Arg Met
1 5 10 15

Arg Ile Arg Thr Trp Asn Ser Leu Val Lys Tyr His Met Tyr Arg Ser
20 25 30

Lys Lys Ala Arg Glu Trp Phe Tyr Arg His His Tyr Gln Ser Pro His
35 40 45

Pro Lys Val Ser Ser Glu Val His Ile Pro Leu Glu Asp Ala Arg Leu
50 55 60

Glu Thr Thr Thr Tyr Trp Gly Leu His Thr Gly Glu Arg Asp Trp His
65 70 75 80

Leu Gly Gln Gly Val Ser Ile Glu Trp Arg Lys Arg Arg Tyr Ser Thr
85 90 95

Gln Val Asp Pro Asp Leu Ala Asp Gln Leu Ile His Leu Tyr Tyr Phe
100 105 110

Asp Cys Phe Ser Glu Ser Ala Ile Arg Lys Ala Ile Leu Gly His Arg
115 120 125

Val Ser Pro Arg Cys Glu Tyr Arg Ala Gly His Ser Lys Val Gly Ser
130 135 140

Leu Gln Tyr Leu Ala Ile Ala Ala Leu Ile Thr Pro Lys Lys Ile Lys
145 150 155 160

Pro Pro Leu Pro Ser Val Arg Lys Leu Thr Glu Asp Arg Trp Asn Lys
165 170 175

Pro Gln Lys Thr Lys Gly His Arg Gly Ser His Thr Met Asn Gly His
180 185 190

<210> 7

<211> 192

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 7

Met Glu Asn Arg Trp Gln Val Met Ile Val Trp Gln Val Asp Arg Met

1

5

10

15

Arg Ile Arg Thr Trp Asn Ser Leu Val Thr Tyr His Met Tyr Arg Ser

20

25

30

Gln Lys Ala Arg Glu Trp Phe Asn Arg His His Tyr His Ser Pro His

35

40

45

Pro Lys Val Ser Ser Glu Val His Ile Pro Leu Glu Asp Ala Arg Leu

50

55

60

Ala Ile Pro Thr Phe Trp Gly Leu His Thr Gly Glu Arg Asp Trp His

65

70

75

80

Leu Gly Gln Gly Val Ser Ile Glu Trp Arg Lys Arg Arg Tyr Ser Thr

85

90

95

Gln Val Asp Pro Asp Leu Ala Asp Gln Leu Ile His Leu Tyr Tyr Phe

100

105

110

Asp Cys Phe Ser Glu Ser Ala Ile Arg Lys Ala Ile Leu Gly His Arg

115

120

125

Val Ser Pro Arg Cys Glu Tyr Arg Ala Gly His Ser Lys Val Gly Ser

130

135

140

Leu Gln Tyr Leu Ala Ile Ala Ala Leu Ile Thr Pro Lys Lys Ile Lys

145

150

155

160

Pro Pro Leu Pro Ser Val Arg Lys Leu Thr Glu Asp Arg Trp Asn Lys

165

170

175

Pro Gln Lys Thr Lys Gly His Arg Gly Ser His Thr Met Asn Gly His

180

185

190

<210> 8

<211> 192

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 8

Met Glu Asn Arg Trp Gln Val Met Ile Val Trp Gln Val Asp Arg Met
1 5 10 15

Arg Ile Arg Thr Trp Asn Ser Leu Val Lys Tyr His Met Tyr Arg Ser
20 25 30

Lys Lys Ala Arg Glu Trp Phe Tyr Arg His His Tyr Gln Ser Pro His
35 40 45

Pro Lys Val Ser Ser Glu Val His Ile Pro Leu Glu Asp Ala Arg Leu
50 55 60

Glu Ile Thr Thr Tyr Trp Gly Leu His Thr Gly Glu Arg Asp Trp His
65 70 75 80

Leu Gly Gln Gly Val Ser Ile Glu Trp Arg Lys Arg Arg Tyr Ser Thr
85 90 95

His Val Asp Pro Asp Leu Ala Asp His Leu Ile His Leu Cys Tyr Phe
100 105 110

Asp Cys Leu Ser Glu Ser Ala Ile Arg Lys Ala Ile Leu Gly His Arg
115 120 125

Val Ser Pro Arg Cys Glu Tyr Arg Ala Gly His Ser Lys Val Gly Ser
130 135 140

Leu Gln Tyr Leu Ala Ile Ala Ala Leu Ile Thr Pro Lys Lys Ile Lys
145 150 155 160

Pro Pro Leu Pro Ser Val Arg Lys Leu Thr Glu Asp Arg Trp Asn Lys
165 170 175

Pro Gln Lys Thr Lys Gly His Arg Gly Ser His Thr Met Asn Gly His
180 185 190

<210> 9

<211> 192

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 9

Met Glu Asn Arg Trp Gln Val Met Ile Val Trp Gln Val Asp Arg Met
1 5 10 15

Arg Ile Arg Thr Trp Asn Ser Leu Val Lys Tyr His Met Tyr Arg Ser
20 25 30

Lys Lys Ala Arg Glu Trp Phe Tyr Arg His His Tyr Gln Ser Pro His
35 40 45

Pro Lys Val Ser Ser Glu Val His Ile Pro Leu Glu Asp Ala Arg Leu
50 55 60

Val Ile Thr Thr Tyr Trp Gly Leu His Thr Gly Glu Arg Asp Trp His
65 70 75 80

Leu Gly Gln Gly Val Ser Ile Glu Trp Arg Lys Arg Arg Tyr Ser Thr
85 90 95

His Val Asp Pro Asp Leu Ala Asp Gln Leu Ile His Leu Tyr Tyr Phe
100 105 110

Asp Cys Phe Ser Glu Ser Ala Ile Arg Lys Ala Ile Leu Gly His Arg
115 120 125

Val Ser Pro Arg Cys Glu Tyr Arg Ala Gly His Ser Lys Val Gly Ser
130 135 140

Leu Gln Tyr Leu Ala Ile Ala Ala Leu Ile Thr Pro Lys Lys Ile Lys
145 150 155 160

Pro Pro Leu Ala Ser Val Arg Lys Leu Thr Glu Asp Arg Trp Asn Lys
165 170 175

Pro Gln Lys Thr Lys Gly His Arg Gly Ser His Thr Met Asn Gly His
180 185 190

<210> 10
<211> 192
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Novel Sequence

<400> 10
Met Glu Asn Arg Trp Gln Val Met Ile Val Trp Gln Val Asp Arg Met
1 5 10 15

Arg Ile Arg Thr Trp Asn Ser Leu Val Lys Tyr His Met Tyr Arg Ser
20 25 30

Lys Lys Ala Arg Glu Trp Phe Tyr Arg His His Tyr Gln Ser Pro His
35 40 45

Pro Lys Val Ser Ser Glu Val His Ile Pro Leu Glu Asp Ala Arg Leu
50 55 60

Val Ile Thr Thr Tyr Trp Gly Leu His Thr Gly Glu Arg Asp Trp His
65 70 75 80

Leu Gly Gln Gly Val Ser Ile Glu Trp Arg Lys Arg Arg Tyr Ser Thr
85 90 95

Gln Val Asp Pro Asp Leu Ala Asp His Leu Ile His Leu Tyr Tyr Phe
100 105 110

Asp Cys Phe Ser Glu Ser Ala Ile Arg Lys Ala Ile Leu Gly His Arg
115 120 125

Val Ser Pro Arg Cys Glu Tyr Arg Ala Gly His Ser Lys Val Gly Ser
130 135 140

Leu Gln Tyr Leu Ala Ile Ala Ala Leu Ile Thr Pro Lys Lys Ile Lys
145 150 155 160

Pro Pro Leu Ala Ser Val Arg Lys Leu Thr Glu Asp Arg Trp Asn Lys
165 170 175

Pro Gln Lys Thr Lys Gly His Arg Gly Ser His Thr Met Asn Gly His
180 185 190

<210> 11
<211> 192
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Novel Sequence

<400> 11
Met Glu Asn Arg Trp Gln Val Met Ile Val Trp Gln Val Asp Arg Met
1 5 10 15

Arg Ile Arg Thr Trp Asn Ser Leu Val Lys Tyr His Met Tyr Arg Ser
20 25 30

Lys Lys Ala Arg Glu Trp Phe Tyr Arg His His Tyr Gln Ser Pro His
35 40 45

Pro Lys Val Ser Ser Glu Val His Ile Pro Leu Glu Asp Ala Arg Leu
50 55 60

Val Ile Thr Thr Phe Trp Gly Leu His Thr Gly Glu Arg Asp Trp His
65 70 75 80

Leu Gly Gln Gly Val Ser Ile Glu Trp Arg Lys Arg Arg Tyr Ser Thr
85 90 95

His Val Asp Pro Asp Leu Ala Asp Gln Leu Ile His Leu Tyr Tyr Phe
100 105 110

Asp Cys Phe Ser Glu Ser Ala Ile Arg Lys Ala Ile Leu Gly His Arg
115 120 125

Val Ser Pro Arg Cys Glu Tyr Arg Ala Gly His Ser Lys Val Gly Ser
130 135 140

Leu Gln Tyr Leu Ala Ile Ala Ala Leu Ile Thr Pro Lys Lys Ile Lys
145 150 155 160

Pro Pro Leu Pro Ser Val Arg Lys Leu Thr Glu Asp Arg Trp Asn Lys
165 170 175

Pro Gln Lys Thr Lys Gly His Arg Gly Ser His Thr Met Asn Gly His
180 185 190

<210> 12

<211> 192

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 12

Met Glu Asn Arg Trp Gln Val Met Ile Val Trp Gln Val Asp Arg Met
1 5 10 15

Arg Ile Arg Thr Trp Asn Ser Leu Val Lys Tyr His Met Tyr Arg Ser
20 25 30

Lys Lys Ala Arg Glu Trp Phe Asn Arg His His Tyr His Arg Pro His
35 40 45

Pro Lys Val Ser Ser Glu Val His Ile Pro Leu Glu Asp Ala Arg Leu
50 55 60

Glu Ile Thr Thr Phe Trp Gly Leu His Thr Gly Glu Arg Asp Trp His
65 70 75 80

Leu Gly Gln Gly Val Ser Ile Glu Trp Arg Lys Arg Arg Tyr Ser Thr
85 90 95

Gln Val Asp Pro Asp Leu Ala Asp Gln Leu Ile His Leu Tyr Tyr Phe
100 105 110

Asp Cys Phe Ser Glu Ser Ala Ile Arg Lys Ala Ile Leu Gly His Arg
115 120 125

Val Ser Pro Arg Cys Glu Tyr Arg Ala Gly His Ser Lys Val Gly Ser
130 135 140

Leu Gln Tyr Leu Ala Ile Ala Ala Leu Ile Thr Pro Lys Lys Ile Lys
145 150 155 160

Pro Pro Leu Pro Ser Val Arg Lys Leu Thr Glu Asp Arg Trp Asn Lys
165 170 175

Pro Gln Lys Thr Lys Gly His Arg Gly Ser His Thr Met Asn Gly His
180 185 190

<210> 13
<211> 192
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Novel Sequence

<400> 13
Met Glu Asn Arg Trp Gln Val Met Ile Val Trp Gln Val Asp Arg Met
1 5 10 15

Arg Ile Arg Thr Trp Asn Ser Leu Val Lys Tyr His Met Tyr Arg Ser
20 25 30

Gln Lys Glu Arg Glu Trp Phe Asn Arg His His Tyr His Ser Pro His
35 40 45

Pro Glu Gln Ser Ser Thr Ala His Ile Pro Leu Val Asp Gly Arg Leu
50 55 60

Glu Lys Ile Ala Val Trp Ser Leu Asp Thr Gly Glu Gly Val Trp His
65 70 75 80

Arg Gly His Arg Val Ser Ile Glu Trp Arg Lys Arg Arg Tyr Ser Thr
85 90 95

Gln Val Asp Pro Asp Leu Val Asp Gln Leu Ile His Leu Tyr Tyr Phe
100 105 110

Asp Cys Phe Ser Glu Ser Ala Ile Arg Lys Ala Ile Leu Gly His Arg
115 120 125

Val Ser Pro Arg Cys Glu Tyr Arg Ala Gly His Ser Lys Val Gly Ser
130 135 140

Leu Gln Tyr Leu Ala Ile Ala Ala Leu Ile Thr Pro Lys Lys Ile Lys
145 150 155 160

Pro Pro Leu Pro Ser Val Arg Lys Leu Thr Glu Asp Arg Trp Asn Lys
165 170 175

Pro Gln Lys Thr Lys Gly His Arg Gly Ser His Thr Met Asn Gly His
180 185 190

<210> 14
<211> 192
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Novel Sequence

<400> 14
Met Glu Asn Arg Trp Gln Val Met Ile Val Trp Gln Val Asp Arg Met
1 5 10 15

Arg Ile Arg Thr Trp Asn Ser Leu Val Lys His His Met Tyr Val Ser
20 25 30

Lys Lys Ala Lys Lys Trp Phe Tyr Arg His His Tyr Glu Ser Pro His
35 40 45

Pro Lys Val Ser Ser Thr Ala His Ile Pro Leu Gly Asp Gly Arg Leu
50 55 60

Glu Lys Thr Ala Val Trp Ser Leu Gln Ala Gly Asp Gly Val Trp His
65 70 75 80

Arg Gly His Pro Val Ser Ile Glu Trp Arg Lys Arg Arg Tyr Ser Thr
85 90 95

Gln Val Asp Pro Asp Leu Val Asp Gln Leu Ile His Leu Tyr Tyr Phe
100 105 110

Asp Cys Phe Ser Glu Ser Ala Ile Arg Lys Ala Ile Leu Gly Tyr Arg
115 120 125

Val Ser Pro Arg Cys Glu Tyr Gln Ala Gly His Asn Lys Val Gly Ser
130 135 140

Leu Gln Tyr Leu Ala Leu Ala Ala Leu Ile Thr Pro Lys Lys Ile Lys
145 150 155 160

Pro Pro Leu Pro Ser Val Arg Lys Leu Thr Glu Asp Arg Trp Asn Lys
165 170 175

Pro Gln Lys Thr Lys Gly His Arg Gly Ser His Thr Met Asn Gly His
180 185 190

<210> 15
<211> 191
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Novel Sequence

<400> 15
Met Glu Asn Arg Trp Gln Val Met Ile Val Trp Gln Val Asp Arg Met
1 5 10 15

Arg Ile Arg Ala Trp Asn Ser Leu Val Lys His His Met Tyr Val Ser
20 25 30

Lys Lys Ala Arg Thr Trp Phe Ser Arg His His Tyr Gly Ser Pro His
35 40 45

Pro Lys Val Cys Ser Glu Val His Ile Pro Leu Gly Asp Ala Arg Leu
50 55 60

Val Ile Thr Thr Tyr Trp Ser Leu His Ala Gly Glu Asp Trp His Val
65 70 75 80

Gly Gln Arg Val Ser Ile Glu Trp Arg Lys Arg Arg Tyr Ser Thr Gln
85 90 95

Val Asp Pro Asp Leu Ala Asp Gln Leu Ile His Leu Tyr Tyr Phe Asp
100 105 110

Cys Phe Ser Glu Ser Ala Ile Arg Lys Ala Ile Leu Gly Tyr Arg Val
115 120 125

Ser Pro Arg Cys Glu Tyr Gln Ala Gly His Asn Lys Val Gly Ser Leu
130 135 140

Gln Tyr Leu Ala Leu Ala Ala Leu Ile Thr Pro Lys Lys Ile Lys Pro
145 150 155 160

Pro Leu Pro Ser Val Arg Lys Leu Thr Glu Asp Arg Trp Asn Lys Pro
165 170 175

Gln Lys Thr Lys Gly His Arg Gly Ser His Thr Met Asn Gly His
180 185 190

<210> 16
<211> 192
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Novel Sequence

<400> 16
Met Glu Asn Arg Trp Gln Val Met Ile Val Trp Gln Val Asp Arg Met
1 5 10 15

Arg Ile Arg Ala Trp Asn Ser Leu Val Lys His His Thr Tyr Phe Ser
20 25 30

Lys Lys Ala Lys Lys Trp Phe Tyr Arg His His Tyr Glu Ser Pro His
35 40 45

Pro Asn Val Ser Ser Glu Val His Ile Pro Leu Gly Asp Ala Arg Leu
50 55 60

Val Thr Thr Pro Tyr Trp Gly Leu His Gly Gly Glu Arg Asp Trp Tyr
65 70 75 80

Leu Ala Gln Gly Val Ser Ile Glu Trp Arg Lys Arg Arg Tyr Ser Thr
85 90 95

Gln Val Asp Pro Asp Leu Ala Asp Gln Leu Ile His Leu Tyr Tyr Phe
100 105 110

Asp Cys Phe Ser Glu Ser Ala Ile Arg Lys Ala Ile Leu Gly Tyr Arg
115 120 125

Val Ser Pro Arg Cys Glu Tyr Gln Ala Gly His Asn Lys Val Gly Ser
130 135 140

Leu Gln Tyr Leu Ala Leu Ala Ala Leu Ile Thr Pro Lys Lys Ile Lys
145 150 155 160

Pro Pro Leu Pro Ser Val Arg Lys Leu Thr Glu Asp Arg Trp Asn Lys
165 170 175

Pro Gln Lys Thr Lys Gly His Arg Gly Ser His Thr Met Asn Gly His
180 185 190

<210> 17

<211> 192

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 17

Met Glu Asn Arg Trp Glu Val Met Ile Val Trp Glu Val Asp Arg Met
1 5 10 15

Arg Ile Arg Ala Trp Asn Ser Leu Val Lys His His Met Tyr Val Ser
20 25 30

Lys Lys Ala Lys Lys Trp Phe Tyr Arg His His Tyr Glu Ser Pro His
35 40 45

Pro Lys Val Ser Ser Glu Val His Ile Pro Leu Gly Asp Ala Arg Leu
50 55 60

Val Ile Thr Thr Tyr Trp Gly Leu His Ala Gly Glu Arg Asp Trp His
65 70 75 80

Leu Gly Gln Gly Val Ser Ile Glu Trp Arg Lys Arg Arg Tyr Ser Thr
85 90 95

Gln Val Asp Pro Asp Leu Ala Asp Gln Leu Ile His Leu Tyr Tyr Phe
100 105 110

Asp Cys Phe Ser Glu Ser Ala Ile Arg Lys Ala Ile Leu Gly Tyr Arg
115 120 125

Val Ser Pro Arg Cys Glu Tyr Gln Ala Gly His Asn Lys Val Gly Ser
130 135 140

Leu Gln Tyr Leu Ala Leu Ala Ala Leu Ile Thr Pro Lys Lys Ile Lys
145 150 155 160

Pro Pro Leu Pro Ser Val Arg Lys Leu Thr Glu Asp Arg Trp Asn Lys
165 170 175

Pro Gln Lys Thr Lys Gly His Arg Gly Ser His Thr Met Asn Gly His
180 185 190

<210> 18
<211> 192
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Novel Sequence

<400> 17
Met Glu Asn Arg Trp Gln Val Met Ile Val Trp Gln Val Asp Arg Met
1 5 10 15

Arg Ile Arg Ala Trp Asn Ser Leu Val Lys His His Met Tyr Val Ser
20 25 30

Lys Asn Ala Lys Lys Trp Phe Tyr Arg His His Tyr Asp Ser Pro His
35 40 45

Pro Val Gln Ser Ser Thr Ala His Ile Pro Leu Gly Asp Gly Arg Leu
50 55 60

Gln Lys Ile Ala Phe Trp Ser Leu Asp Ala Gly Glu Arg Asp Trp His
65 70 75 80

Leu Gly Gln Gly Val Ser Ile Glu Trp Arg Lys Arg Arg Tyr Ser Thr
85 90 95

Gln Val Asp Pro Asp Leu Ala Asp Gln Leu Ile His Leu Tyr Tyr Phe
100 105 110

Asp Cys Phe Ser Glu Ser Ala Ile Arg Lys Ala Ile Leu Gly Tyr Arg
115 120 125

Val Ser Pro Arg Cys Glu Tyr Gln Ala Gly His Asn Lys Val Gly Ser
130 135 140

Leu Gln Tyr Leu Ala Leu Ala Ala Leu Ile Thr Pro Lys Lys Ile Lys
145 150 155 160

Pro Pro Leu Pro Ser Val Arg Lys Leu Thr Glu Asp Arg Trp Asn Lys
165 170 175

Pro Gln Lys Thr Lys Gly His Arg Gly Arg His Thr Met Asn Gly His
180 185 190

<210> 19
<211> 192
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Novel Sequence

<400> 19
Met Glu Asn Arg Trp Gln Val Met Ile Val Trp Gln Val Asp Arg Met
1 5 10 15

Arg Ile Arg Ala Trp Asn Ser Leu Val Lys His His Met Tyr Val Ser
20 25 30

Lys Lys Ala Lys Lys Trp Phe Tyr Arg His His Tyr Asp Ser Pro His
35 40 45

Pro Lys Val Ser Ser Glu Val His Ile Pro Leu Gly Asp Ala Arg Leu
50 55 60

Glu Thr Thr Thr Tyr Trp Gly Leu His Ala Gly Glu Arg Asp Trp His
65 70 75 80

Leu Gly Gln Gly Val Ser Ile Glu Trp Arg Lys Arg Arg Tyr Ser Thr
85 90 95

His Val Asp Pro Asp Leu Ala Asp Gln Leu Ile His Leu Tyr Tyr Phe
100 105 110

Asp Cys Phe Ser Glu Ser Ala Ile Arg Lys Ala Ile Leu Gly Tyr Arg
115 120 125

Val Ser Pro Arg Cys Glu Tyr Gln Ala Gly His Asn Lys Val Gly Ser
130 135 140

Leu Gln Tyr Leu Ala Leu Ala Ala Leu Ile Thr Pro Lys Lys Ile Lys
145 150 155 160

Pro Pro Leu Pro Ser Val Arg Lys Leu Thr Glu Asp Arg Trp Asn Lys
165 170 175

Pro Gln Lys Thr Lys Gly His Arg Gly Ser His Thr Met Asn Gly His
180 185 190

<210> 20
<211> 192
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Novel Sequence

<400> 20
Met Glu Asn Arg Trp Gln Val Met Ile Val Trp Gln Val Asp Arg Met
1 5 10 15

Thr Ile Arg Ala Trp Asn Ser Leu Val Lys His His Met Tyr Val Ser
20 25 30

Lys Lys Ala Lys Lys Trp Phe Tyr Arg His His Tyr Glu Ser Pro His
35 40 45

Pro Lys Val Ser Ser Glu Val His Ile Pro Leu Gly Asp Ala Arg Leu
50 55 60

Val Ile Thr Thr Tyr Trp Gly Leu His Ala Gly Glu Arg Asp Trp His
65 70 75 80

Leu Gly Gln Gly Val Ser Ile Glu Trp Arg Lys Arg Arg Tyr Ser Thr
85 90 95

Gln Val Asp Pro Asp Leu Ala Asp Gln Leu Thr His Leu Tyr Tyr Phe
100 105 110

Asp Cys Phe Ser Glu Ser Ala Ile Arg Lys Ala Ile Leu Gly Tyr Arg
115 120 125

Val Ser Pro Arg Cys Glu Tyr Gln Ala Gly His Asn Lys Val Gly Ser
130 135 140

Leu Gln Tyr Leu Ala Leu Ala Ala Leu Ile Thr Pro Lys Lys Ile Lys
145 150 155 160

Pro Pro Leu Pro Ser Val Arg Lys Leu Thr Glu Asp Arg Trp Asn Lys
165 170 175

Pro Gln Lys Thr Lys Gly His Arg Gly Ser His Thr Met Asn Gly His
180 185 190

<210> 21
<211> 188
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Novel Sequence

<400> 21
Met Glu Asn Arg Trp Gln Val Met Ile Val Trp Gln Val Asp Arg Met
1 5 10 15

Arg Ile Arg Ala Trp Asn Ser Leu Val Lys His His Met Tyr Val Ser
20 25 30

Lys Lys Ala Lys Lys Trp Phe Asn Arg His His Tyr Asp Arg Pro His
35 40 45

Pro Lys Val Ser Ser Glu Val His Ile Pro Leu Gly Asp Ala Arg Leu
50 55 60

Glu Ile Thr Thr Phe Trp Gly Leu His Ala Gly Glu Arg Asp Trp His
65 70 75 80

Leu Gly Gln Arg Val Ser Ile Glu Trp Arg Lys Arg Arg Tyr Ser Thr
85 90 95

Gln Val Asp Pro Asp Leu Ala Asp Gln Leu Thr His Leu Tyr Tyr Phe
100 105 110

Asp Cys Phe Ser Glu Ser Ala Ile Arg Lys Ala Ile Leu Gly Tyr Arg
115 120 125

Val Ser Pro Arg Cys Glu Tyr Gln Ala Gly His Asn Lys Val Gly Ser
130 135 140

Leu Gln Tyr Leu Ala Leu Ala Ala Leu Ile Thr Pro Lys Lys Ile Lys
145 150 155 160

Pro Pro Leu Pro Ser Val Arg Lys Leu Thr Glu Asp Arg Trp Asn Lys
165 170 175

Pro Gln Lys Thr Lys Gly Thr Glu Gly Ala Ile Gln
180 185

<210> 22

<211> 192

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 22

Met Glu Asn Arg Trp Gln Val Met Ile Val Trp Gln Val Asp Arg Met
1 5 10 15

Arg Ile Arg Ala Trp Asn Ser Leu Val Lys His His Met Phe Val Ser
20 25 30

Lys Lys Ala Lys Lys Trp Phe Tyr Arg His His Tyr Glu Ser Pro His
35 40 45

Pro Lys Val Ser Ser Glu Val His Ile Pro Leu Gly Asp Ala Arg Leu
50 55 60

Glu Ile Thr Thr Phe Trp Gly Leu His Ala Gly Glu Arg Asp Trp His
65 70 75 80

Leu Gly Gln Gly Val Ser Ile Glu Trp Arg Lys Arg Arg Tyr Ser Thr
85 90 95

Gln Val Asp Pro Asp Leu Ala Asp Gln Leu Ile His Leu Tyr Tyr Phe
100 105 110

Gly Cys Phe Ser Glu Ser Ala Ile Arg Lys Ala Ile Leu Gly Tyr Arg
115 120 125

Val Ser Pro Arg Cys Glu Tyr Gln Ala Gly His Asn Lys Val Gly Ser
130 135 140

Leu Gln Tyr Leu Gly Leu Ala Ala Leu Ile Thr Pro Lys Lys Ile Lys
145 150 155 160

Pro Pro Leu Pro Ser Val Arg Lys Leu Thr Glu Asp Arg Trp Asn Lys
165 170 175

Pro Gln Lys Thr Lys Gly His Arg Gly Ser His Thr Met Asn Gly His
180 185 190

<210> 23
<211> 192
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Novel Sequence

<400> 23
Met Glu Asn Arg Trp Gln Val Met Ile Val Trp Gln Val Asp Arg Met
1 5 10 15

Arg Ile Arg Ala Trp Asn Ser Leu Val Lys His His Met Tyr Val Ser
20 25 30

Lys Lys Ala Lys Lys Trp Phe Tyr Arg His His Tyr Glu Ser Pro His
35 40 45

Pro Gln Val Ser Ser Glu Val His Ile Pro Leu Gly Asp Ala Arg Leu
50 55 60

Glu Ile Thr Thr Tyr Trp Gly Leu His Ala Gly Glu Arg Asp Trp His
65 70 75 80

Leu Gly Gln Gly Val Ser Ile Glu Trp Arg Lys Arg Arg Tyr Ser Thr
85 90 95

Gln Val Asp Pro Asp Leu Ala Asp Gln Leu Ile His Leu Tyr Tyr Phe
100 105 110

Asp Cys Phe Ser Glu Ser Ala Ile Arg Lys Ala Ile Leu Gly Tyr Arg
115 120 125

Val Ser Pro Arg Cys Glu Tyr Gln Ala Gly His Asn Lys Val Gly Ser
130 135 140

Leu Gln Tyr Leu Ala Leu Ala Ala Leu Ile Thr Pro Lys Lys Ile Lys
145 150 155 160

Pro Pro Leu Pro Ser Val Arg Lys Leu Thr Glu Asp Arg Trp Asn Lys
165 170 175

Pro Gln Lys Thr Lys Gly His Arg Gly Ser His Thr Met Asn Gly His
180 185 190

<210> 24
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Novel Sequence

<400> 24
Ile Glu Trp Arg Lys Lys Arg Tyr
1 5

<210> 25
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Novel Sequence

<400> 25
Asp Arg Trp Asn Lys Pro Gln
1 5

<210> 26
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Novel Sequence

<400> 26
Ser Leu Gln Tyr Leu Ala
1 5

<210> 27
<211> 579
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Novel Sequence

<400> 27

atggaaaaca gatggcaggt gattattgtg tggcaggtag acaggatgag gattagaaca 60
 tggaacagtt tagtaaaata ccatatgtat tgatcaaaga aagctaggga atggttttat 120
 tgacatcact atcaaagtcc tcatccaaaa gtaagttcag aagtacacat ccactagag 180
 gatgctagat tggaaataac atcattttgg ggtctgcata caggagaaaag agactggcat 240
 ttgggtcagg gagtctccat agaatggagg aaaaggagat atagcacaca cgctgaccct 300
 gatctagcag accaactaat tcatctgtat tattttgatt gttttcaga atctgctata 360
 agaaaagcca tattaggaca cagagttagt cctaggtgtg aatatcgagc aggacatagc 420
 aaggtaggat cactacagta cttggcaata gcagcattaa taacacaaa aaagataaag 480
 ccacctttgg cgagtgtcag gaaactgaca gaggatagat ggaacaagcc ccagaagacc 540
 aagggccaca gagggagcca tacaatgaat ggacactag 579

<210> 28

<211> 579

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 28

atggaaaaca gatggcaggt gatgattgtg tggcaggtag acaggatgag gattagaaca 60
 tggaacagtt tagtaaaata ccatatgtat agatcaaaga aagctaggga atggttttat 120
 agacatcact atcaaagtcc tcatccaaga gtaagttcag aagtacacat ccactagag 180
 gatgctagat tggaaataac aacatattgg ggtctgcata caggagaaaag agactggcat 240
 ttgggtcagg gagtctccat agaatggagg aaaaggagat atagcacaca agtagaccct 300
 gatctagcag accaactaat tcatctgtat tattttgatt gttttcaga atctgctata 360
 agaaaagcca tattaggaca cagagttagt cctaggtgtg aatatcgagc aggacatagc 420
 aaggtaggat cactacagta cttggcaata gcagcattaa taacacaaa aaagataaag 480
 ccacctttgc cgagtgtcag gaaactgaca gaggatagat ggaacaagcc ccagaagacc 540
 aagggccaca gagggagcca tacaatgaat ggacactag 579

<210> 29

<211> 579

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 29

atggaaaaca gatggcaggt gatgattgtg tggcaggtag acaggatgag gattagaaca 60
 tggaacagtt tagtaaaata ccatatgtat agatcaaaga aagctaggga atggttttat 120
 agacatcact atcaaagtcc tcatccaaaa gtaagttcag aagtacacat ccactagag 180
 gatgctagat tggaaataac aacatattgg ggtctgcata caggagaaaag agactggcat 240
 ttgggtcagg gagtctccat agaatggagg aaaaggagat atagcacaca agtagaccct 300

gatctagcag accaactaat tcactgtat tttttgatt gttttcaga atctgctata 360
agaaaagcca tattaggaca cagagttagt ctaggtgtg aatatcgagc aggacatagc 420
aaggtaggat cactacagta cttggcaata gcagcattaa taacaccaa aaagataaag 480
ccacctttgc cgagtgtcag gaaactgaca gaggatagat ggaacaagcc ccagaagacc 540
aagggccaca gagggagcca tacaatgaat ggacactag 579

<210> 30

<211> 579

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 30

atggaaaaca gatggcaggt gatgattgtg tggcaggtag acaggatgag gattagaaca 60
tggaacagtt tagtaacata ccatatgtat agatcacaga aagctaggga atggtttaat 120
agacatcact atcacagtcc tcacccaaaa gtaagttcag aagtcacat ccactagag 180
gatgctagat tggcaatacc aacattttgg ggtctgcata caggagaaag agactggcat 240
ttgggtcagg gagtctccat agaatggagg aaaaggagat atagcacaca agtagaccct 300
gatctagcag accaactaat tcactgtat tttttgatt gttttcaga atctgctata 360
agaaaagcca tattaggaca cagagttagt ctaggtgtg aatatcgagc aggacatagc 420
aaggtaggat cactacagta cttggcaata gcagcattaa taacaccaa aaagataaag 480
ccacctttgc cgagtgtcag gaaactgaca gaggatagat ggaacaagcc ccagaagacc 540
aagggccaca gagggagcca tacaatgaat ggacactag 579

<210> 31

<211> 579

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 31

atggaaaaca gatggcaggt gatgattgtg tggcaggtag acaggatgag gattagaaca 60
tggaacagtt tagtaaaata ccatatgtat agatcaaaga aagctaggga atggtttat 120
agacatcact atcaaagtcc tcacccaaaa gtaagttcag aagtcacat ccactagag 180
gatgctagat tggaaataac aacatattgg ggtctgcata caggagaaag agactggcat 240
ttgggtcagg gagtctccat agaatggagg aaaaggagat atagcacaca cgtagaccct 300
gatctgcag accaccta atctctgtgt tttttgatt gtcttcaga atctgctata 360
agaaaagcca tattaggaca cagagttagt ctaggtgtg aatatcgagc aggacatagc 420
aaggtaggat cactacagta cttggcaata gcagcattaa taacaccaa aaagataaag 480
ccacctttgc cgagtgtcag gaaactgaca gaggatagat ggaacaagcc ccagaagacc 540
aagggccaca gagggagcca tacaatgaat ggacactag 579

<210> 32
<211> 579
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Novel Sequence

<400> 32
atggaaaaca gatggcaggt gatgattgtg tggcaggtag acaggatgag gattagaaca 60
tggaacagtt tagtaaaata ccatatgtat agatcaaaga aagctaggga atggttttat 120
agacatcact atcaaagtcc tcatacaaaa gtaagttcag aagtacacat ccactagag 180
gatgctagat tggtaataac aacatattgg ggtctgcata caggagaaag agactggcat 240
ttgggtcagg gagtctccat agaatggagg aaaaggagat atagcacaca cgtagaccct 300
gatctagcag accaactaat tcactgtat tttttgatt gttttcaga atctgctata 360
agaaaagcca tattaggaca cagagttagt cctaggtgtg aatatcgagc aggacatagc 420
aaggtaggat cactacagta ctggcaata gcagcattaa taacacaaa aaagataaag 480
ccaccttgg cgagtgtcag gaaactgaca gaggatagat ggaacaagcc ccagaagacc 540
aagggccaca gagggagcca tacaatgaat ggacactag 579

<210> 33
<211> 579
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Novel Sequence

<400> 33
atggaaaaca gatggcaggt gatgattgtg tggcaggtag acaggatgag gattagaaca 60
tggaacagtt tagtaaaata ccatatgtat agatcaaaga aagctaggga atggttttat 120
agacatcact atcaaagtcc tcatacaaaa gtaagttcag aagtacacat ccactagag 180
gatgctagat tggtaataac aacatattgg ggtctgcata caggagaaag agactggcat 240
ttgggtcagg gagtctccat agaatggagg aaaaggagat atagcacaca agtagaccct 300
gatctagcag accacctaata tcactgtat tttttgatt gttttcaga atctgctata 360
agaaaagcca tattaggaca cagagttagt cctaggtgtg aatatcgagc aggacatagc 420
aaggtaggat cactacagta ctggcaata gcagcattaa taacacaaa aaagataaag 480
ccaccttgg cgagtgtcag gaaactgaca gaggatagat ggaacaagcc ccagaagacc 540
aagggccaca gagggagcca tacaatgaat ggacactag 579

<210> 34
<211> 579
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 34

atggaaaaca gatggcaggt gatgatttg tggcaggtag acaggatgag gattagaaca 60
tggaacagtt tagtaaaata ccatatgtat agatcaaaga aagctaggga atggttttat 120
agacatcact atcaaagtcc tcatccaaaa gtaagttcag aagtacacat ccactagag 180
gatgctagat tggtataaac aacattttgg ggtctgcata caggagaaag agactggcat 240
ttgggtcagg gagtctccat agaatggagg aaaaggagat atagcacaca cgtagaccct 300
gatctagcag accaactaat tcatctgtat tttttgatt gttttcaga atctgctata 360
agaaaagcca tattaggaca cagagttagt cctaggtgtg aatatcgagc aggacatagc 420
aaggtaggat cactacagta ctggcaata gcagcattaa taacaccaa aaagataaag 480
ccaccttgc cgagtgcag gaaactgaca gaggatagat ggaacaagcc ccagaagacc 540
aagggtcaca gagggagcca tacaatgaat ggacactag 579

<210> 35

<211> 579

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 35

atggaaaaca gatggcaggt gatgatttg tggcaggtag acaggatgag gattagaaca 60
tggaacagtt tagtaaaata ccatatgtat agatcaaaga aagctaggga atggtttaat 120
agacatcact atcaccgtcc tcatccaaaa gtaagttcag aagtccacat ccactagag 180
gatgctagat tggaataaac aacattttgg ggtctgcata caggagaaag agactggcat 240
ttgggtcagg gagtctccat agaatggagg aaaaggagat atagcacaca agtagaccct 300
gatctagcag accaactaat tcatctgtat tttttgatt gttttcaga atctgctata 360
agaaaagcca tattaggaca cagagttagt cctaggtgtg aatatcgagc aggacatagc 420
aaggtaggat cactacagta ctggcaata gcagcattaa taacaccaa aaagataaag 480
ccaccttgc cgagtgcag gaaactgaca gaggatagat ggaacaagcc ccagaagacc 540
aagggccaca gagggagcca tacaatgaat ggacactag 579

<210> 36

<211> 584

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 36

atggaaaaca gatggcaggt gatgatttg tggcaggtag acaggatgag gattagaaca 60

tggaacagtt tagtaaaata ccatatgtat tgatcaaaga aaagaaagaa agggaatggt 120
 tttatagaca tcactatcac agccctcatc cagaacaaag ttcaacagcc cacatccgc 180
 tagtgatgg tagattggaa aaaatagcag ttggagtct ggatacagga gatggcgtct 240
 ggcacagggg gcatcgagtc tccatagaat ggaggaaaag gagatatagc acacaagtag 300
 accctgatct agtagacca ctaattcatc tgtattattt tgattgttt tcagaatctg 360
 ctataagaaa agccatatta ggacacagag ttagtcctag gtgtgaatat cgagcaggac 420
 atagcaaggt aggatcacta cagtacttgg caatagcagc attaataaca caaaaaaga 480
 taaagccacc ttgccgagt gtcaggaac tgacagagga tagatggaac aagccccaga 540
 agaccaaggg ccacagaggg agccatacaa tgaatggaca ctag 584

<210> 37

<211> 579

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 37

atggaaaaca gatggcaggt gatgatttg tggcaagtag acaggatgag gattagaaca 60
 tggaacagtt tagtaaaaca ccatatgtat gttcaaaga aagctaagaa atggttttat 120
 agacatcact atgaaagccc tcatcaaaa gtaagtcaa cagcccacat cccgctaggg 180
 gatgtagat tggagaaaac agcagtttgg agtctgcagg caggagatgg agtctggcac 240
 aggggggcatc cagtctccat agaatggagg aaaaggagat atagcacaca agtagaccct 300
 gatttgtag accaactaat tcattctgtat tttttgatt gttttcaga atctgctata 360
 agaaaagcca tattagcata tagagttagt ctaggttg aataccaagc aggacataat 420
 aaggtaggat ctctacagta ctggcacta gcagcattaa taacaccaa gaagataaag 480
 ccaccttgc ctagtgttag gaaactgaca gaggatagat ggaacaagcc ccagaagacc 540
 aagggccaca gagggagcca tacaatgaat ggacactag 579

<210> 38

<211> 579

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 38

atggaaaaca gatggcaggt gatgatttg tggcaagtag acaggatgag gattagagca 60
 tggaacagtt tagtaaaaca ccatatgtat gttcaaaga aagctaggac atggttttct 120
 agacatcact atggaagccc tcatcaaaa gtatgttcag aagtacacat ccactaggg 180
 gatgtagat tggtagaac aacatattgg agtctgcatg caggagaatg agactggcat 240
 gtgggtcaga gagtctccat agaatggagg aaaaggagat atagcacaca agtagaccct 300
 gacttggcag accaactaat tcattctgtat tttttgatt gttttcaga atctgctata 360

agaaaagcca tattaggata tagagttagt ctaggtgtg aataccaagc aggacataat 420
aaggtaggat ctctacagta cttggcacta gcagcattaa taacaccaa gaagataaag 480
ccacctttgc ctagtgtgag gaaactgaca gaggatagat ggaacaagcc ccagaagacc 540
aagggccaca gagggagcca tacaatgaat ggacactag 579

<210> 39

<211> 579

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 39

atggaaaaca gatggcaggt gatgattgtg tggcaagtag acaggatgag gattagagca 60
tggaacagtt tagtaaaaca ccatatttat tttcaaaga aagctaagaa atggttttat 120
agacatcact atgaaagccc tcatccaaac gtaagttcag aagtacacat cccactaggg 180
gatgctagat tggtgacaac accatattgg ggtctgcatg gaggagaaag agactggtat 240
ctggctcagg gagtctccat agaatggagg aaaaggagat atagcacaca agtagaccct 300
gacctggcag accaactaat tcatctgtat tatTTtgatt gttttcaga atctgctata 360
agaaaagcca tattaggata tagagttagt ctaggtgtg aataccaagc aggacataat 420
aaggtaggat ctctacagta cttggcacta gcagcattaa taacaccaa gaagataaag 480
ccacctttgc ctagtgtgag gaaactgaca gaggatagat ggaacaagcc ccagaagacc 540
aagggccaca gagggagcca tacaatgaat ggacactag 579

<210> 40

<211> 579

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 40

atggaaaaca gatgggaggt gatgattgtg tgggaagtag acaggatgag gattagagca 60
tggaacagtt tagtaaaaca ccatatgtat gttcaaaga aagctaagaa atggttttat 120
agacatcact atgaaagccc tcatccaaaa gtaagttcag aagtacacat cccactaggg 180
gatgctagat tggtgataac aacatattgg ggtctgcatg caggagaaag agactggcat 240
ttgggtcagg gagtctccat agaatggagg aaaaggagat atagcacaca agtagaccct 300
gacctggcag accaactaat tcatctgtat tatTTtgatt gttttcaga atctgctata 360
agaaaagcca tattaggata tagagttagt ctaggtgtg aataccaagc aggacataat 420
aaggtaggat ctctacagta cttggcacta gcagcattaa taacaccaa gaagataaag 480
ccacctttgc ctagtgtgag gaaactgaca gaggatagat ggaacaagcc ccagaagacc 540
aagggccaca gagggagcca tacaatgaat ggacactag 579

<210> 41
<211> 579
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Novel Sequence

<400> 41
atggaaaaca gatggcaggt gatgatttg tggcaagtag acaggatgag gattagagca 60
tggaacagtt tagtaaaaca ccatatgtat gtttcaaaga acgctaagaa atggttttat 120
cgacatcact atgacagccc tcatccagtc caaagttcaa cagcccacat cccgctaggg 180
gatggtagat tgcagaaaat agcattttgg agtctggatg caggagaaag agactggcat 240
ttgggtcagg gagtctccat agaatggagg aaaaggagat atagcacaca agtagaccct 300
gacctggcag accaactaat tcatctgtat tattttgatt gttttcaga atctgctata 360
agaaaagcca tattaggata tagagttagt cctaggtgtg aataccaagc aggacataat 420
aaggtaggat ctctacagta cttggcacta gcagcattaa taacaccaa gaagataaag 480
ccacctttgc ctagtgtgag gaaactgaca gaggatagat ggaacaagcc ccagaagacc 540
aaggggcaca gagggaggca tacaatgaat ggacactag 579

<210> 42
<211> 579
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Novel Sequence

<400> 42
atggaaaaca gatggcaggt gatgatttg tggcaagtag acaggatgag gattagagca 60
tggaacagtt tagtaaaaca ccatatgtat gtttcaaaga aagctaagaa atggttttat 120
agacatcact atgacagccc tcatcaaaa gtaagttcag aagtacacat ccactaggg 180
gatgctagat tggagataac aacatattgg ggtctgcatg caggagaaag agactggcat 240
ttgggtcagg gagtctccat agaatggagg aaaaggagat atagcacaca cgtagaccct 300
gacctggcag accaactaat tcatctgtat tattttgatt gttttcaga atctgctata 360
agaaaagcca tattaggata tagagttagt cctaggtgtg aataccaagc aggacataat 420
aaggtaggat ctctacagta cttggcacta gcagcattaa taacaccaa gaagataaag 480
ccacctttgc ctagtgtgag gaaactgaca gaggatagat ggaacaagcc ccagaagacc 540
aagggccaca gagggagcca tacaatgaat ggacactag 579

<210> 43
<211> 579
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 43

atggaaaaca gatggcaggt gatgatttg tggcaagtag acaggatgac gattagagca 60
tggaacagtt tagtaaaaca ccatatgtat gttcaaaga aagctaagaa atggtttat 120
agacatcact atgaaagccc tcatcaaaa gtaagttcag aagtacacat cccactaggg 180
gatgctagat tggtagataac aacatattgg ggtctgcatg caggagaaag agactggcat 240
ttgggtcagg gagtctccat agaattggagg aaaaggagat atagcacaca agtagaccct 300
gacttggcag accaactaac tcatctgtat tattttgatt gttttcaga atctgctata 360
agaaaagcca tattaggata tagagttagt cctaggtgtg aataccaagc aggacataat 420
aaggtaggat ctctacagta cttggcacta gcagcattaa taacaccaa gaagataaag 480
ccaccttgc ctagtgtgag gaaactgaca gaggatagat ggaacaagcc ccagaagacc 540
aagggccaca gagggagcca tacaatgaat ggacactag 579

<210> 44

<211> 578

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 44

atggaaaaca gatggcaggt gatgatttg tggcaagtag acaggatgag gattagagca 60
tggaacagtt tagtaaaaca ccatatgtat gttcaaaga aagctaagaa atggtttaa 120
agacatcact atgaccgccc tcatcaaaa gtaagttcag aagtccacat cccactaggg 180
gatgctagat tggagataac aacattttgg ggtctgcatg caggagaaag agactggcat 240
ttgggtcagc gagtctccat agaattggagg aaaaggagat atagcacaca agtagaccct 300
gacttggcag accaactaac tcatctgtat tattttgatt gttttcaga atctgctata 360
agaaaagcca tattaggata tagagttagt cctaggtgtg aataccaagc aggacataat 420
aaggtaggat ctctacagta cttggcacta gcagcattaa taacaccaa gaagataaag 480
ccaccttgc ctagtgtgag gaaactgaca gaggatagat ggaacaagcc ccagaagacc 540
aagggcacag agggagccat acaatgaatg gacactag 578

<210> 45

<211> 579

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 45

atggaaaaca gatggcaggt gatgatttg tggcaagtag acaggatgag gattagagca 60

tggaacagtt tagtaaaaca ccatatgttt gtttcaaaga aagctaagaa atggttttat 120
 agacatcact atgaaagccc tcatccaaaa gtaagttcag aagtacacat ccactaggg 180
 gatgctagat tggagataac aacattttgg ggtctgcatg caggagaaag agactggcat 240
 ttgggtcagg gagtctccat agaatggagg aaaaggagat atagcacaca agtagaccct 300
 gacctggcag accaactaat tcatctgtat tattttggtt gttttcaga atctgctata 360
 agaaaagcca tattaggata tagagttagt cctaggtgtg aataccaagc aggacataat 420
 aaggtaggat ctctacagta cttgggacta gcagcattaa taacaccaa gaagataaag 480
 ccacctttgc ctagtgtgag gaaactgaca gaggatagat ggaacaagcc ccagaagacc 540
 aagggccaca gagggagcca tacaatgaat ggacactag 579

<210> 46

<211> 579

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 46

atggaaaaca gatggcaggt gatgattgtg tggcaagtag acaggatgag gattagagca 60
 tggaacagtt tagtaaaaca ccatatgtat gtttcaaaga aagctaagaa atggttttat 120
 agacatcact atgaaagccc tcatccacaa gtaagttcag aagtacacat ccactaggg 180
 gatgctagat tggagataac aacatattgg ggtctgcatg caggagaaag agactggcat 240
 ttgggtcagg gagtctccat agaatggagg aaaaggagat atagcacaca agtagaccct 300
 gacctggcag accaactaat tcatctgtat tatttgatt gttttcaga atctgctata 360
 agaaaagcca tattaggata tagagttagt cctaggtgtg aataccaagc aggacataat 420
 aaggtaggat ctctacagta cttggcacta gcagcattaa taacaccaa gaagataaag 480
 ccacctttgc ctagtgtgag gaaactgaca gaggatagat ggaacaagcc ccagaagacc 540
 aagggccaca gagggagcca tacaatgaat ggacactag 579

12345678910111213141516171819202122232425262728293031323334353637383940414243444546474849505152535455565758596061626364656667686970717273747576777879808182838485868788899091929394959697989910010110210310410510610710810911011111211311411511611711811912012112212312412512612712812913013113213313413513613713813914014114214314414514614714814915015115215315415515615715815916016116216316416516616716816917017117217317417517617717817918018118218318418518618718818919019119219319419519619719819920020120220320420520620720820921021121221321421521621721821922022122222322422522622722822923023123223323423523623723823924024124224324424524624724824925025125225325425525625725825926026126226326426526626726826927027127227327427527627727827928028128228328428528628728828929029129229329429529629729829930030130230330430530630730830931031131231331431531631731831932032132232332432532632732832933033133233333433533633733833934034134234334434534634734834935035135235335435535635735835936036136236336436536636736836937037137237337437537637737837938038138238338438538638738838939039139239339439539639739839940040140240340440540640740840941041141241341441541641741841942042142242342442542642742842943043143243343443543643743843944044144244344444544644744844945045145245345445545645745845946046146246346446546646746846947047147247347447547647747847948048148248348448548648748848949049149249349449549649749849950050150250350450550650750850951051151251351451551651751851952052152252352452552652752852953053153253353453553653753853954054154254354454554654754854955055155255355455555655755855956056156256356456556656756856957057157257357457557657757857958058158258358458558658758858959059159259359459559659759859960060160260360460560660760860961061161261361461561661761861962062162262362462562662762862963063163263363463563663763863964064164264364464564664764864965065165265365465565665765865966066166266366466566666766866967067167267367467567667767867968068168268368468568668768868969069169269369469569669769869970070170270370470570670770870971071171271371471571671771871972072172272372472572672772872973073173273373473573673773873974074174274374474574674774874975075175275375475575675775875976076176276376476576676776876977077177277377477577677777877978078178278378478578678778878979079179279379479579679779879980080180280380480580680780880981081181281381481581681781881982082182282382482582682782882983083183283383483583683783883984084184284384484584684784884985085185285385485585685785885986086186286386486586686786886987087187287387487587687787887988088188288388488588688788888989089189289389489589689789889990090190290390490590690790890991091191291391491591691791891992092192292392492592692792892993093193293393493593693793893994094194294394494594694794894995095195295395495595695795895996096196296396496596696796896997097197297397497597697797897998098198298398498598698798898999099199299399499599699799899910001001100210031004100510061007100810091010101110121013101410151016101710181019102010211022102310241025102610271028102910301031103210331034103510361037103810391040104110421043104410451046104710481049105010511052105310541055105610571058105910601061106210631064106510661067106810691070107110721073107410751076107710781079108010811082108310841085108610871088108910901091109210931094109510961097109810991100110111021103110411051106110711081109111011111112111311141115111611171118111911201121112211231124112511261127112811291130113111321133113411351136113711381139114011411142114311441145114611471148114911501151115211531154115511561157115811591160116111621163116411651166116711681169117011711172117311741175117611771178117911801181118211831184118511861187118811891190119111921193119411951196119711981199120012011202120312041205120612071208120912101211121212131214121512161217121812191220122112221223122412251226122712281229123012311232123312341235123612371238123912401241124212431244124512461247124812491250125112521253125412551256125712581259126012611262126312641265126612671268126912701271127212731274127512761277127812791280128112821283128412851286128712881289129012911292129312941295129612971298129913001301130213031304130513061307130813091310131113121313131413151316131713181319132013211322132313241325132613271328132913301331133213331334133513361337133813391340134113421343134413451346134713481349135013511352135313541355135613571358135913601361136213631364136513661367136813691370137113721373137413751376137713781379138013811382138313841385138613871388138913901391139213931394139513961397139813991400140114021403140414051406140714081409141014111412141314141415141614171418141914201421142214231424142514261427142814291430143114321433143414351436143714381439144014411442144314441445144614471448144914501451145214531454145514561457145814591460146114621463146414651466146714681469147014711472147314741475147614771478147914801481148214831484148514861487148814891490149114921493149414951496149714981499150015011502150315041505150615071508150915101511151215131514151515161517151815191520152115221523152415251526152715281529153015311532153315341535153615371538153915401541154215431544154515461547154815491550155115521553155415551556155715581559156015611562156315641565156615671568156915701571157215731574157515761577157815791580158115821583158415851586158715881589159015911592159315941595159615971598159916001601160216031604160516061607160816091610161116121613161416151616161716181619162016211622162316241625162616271628162916301631163216331634163516361637163816391640164116421643164416451646164716481649165016511652165316541655165616571658165916601661166216631664166516661667166816691670167116721673167416751676167716781679168016811682168316841685168616871688168916901691169216931694169516961697169816991700170117021703170417051706170717081709171017111712171317141715171617171718171917201721172217231724172517261727172817291730173117321733173417351736173717381739174017411742174317441745174617471748174917501751175217531754175517561757175817591760176117621763176417651766176717681769177017711772177317741775177617771778177917801781178217831784178517861787178817891790179117921793179417951796179717981799180018011802180318041805180618071808180918101811181218131814181518161817181818191820182118221823182418251826182718281829183018311832183318341835183618371838183918401841184218431844184518461847184818491850185118521853185418551856185718581859186018611862186318641865186618671868186918701871187218731874187518761877187818791880188118821883188418851886188718881889189018911892189318941895189618971898189919001901190219031904190519061907190819091910191119121913191419151916191719181919192019211922192319241925192619271928192919301931193219331934193519361937193819391940194119421943194419451946194719481949195019511952195319541955195619571958195919601961196219631964196519661967196819691970197119721973197419751976197719781979198019811982198319841985198619871988198919901991199219931994199519961997199819992000200120022003200420052006200720082009201020112012201320142015201620172018201920202021202220232024202520262027202820292030203120322033203420352036203720382039204020412042204320442045204620472048204920502051205220532054205520562057205820592060206120622063206420652066206720682069207020712072207320742075207620772078207920802081208220832084208520862087208820892090209120922093209420952096209720982099210021012102210321042105210621072108210921102111211221132114211521162117211821192120212121222123212421252126212721282129213021312132213321342135213621372138213921402141214221432144214521462147214821492150215121522153215421552156215721582159216021612162216321642165216621672168216921702171217221732174217521762177217821792180218121822183218421852186218721882189219021912192219321942195219621972198219922002201220222032204220522062207220822092210221122122213221422152216221722182219222022212222222322242225222622272228222922302231223222332234223522362237223822392240224122422243224422452246224722482249225022512252225322542255225622572258225922602261226222632264226522662267226822692270227122722273227422752276227722782279228022812282228322842285228622872288228922902291229222932294229522962297229822992300230123022303230423052306230723082309231023112312231323142315231623172318231923202321232223232324232523262327232823292330233123322333233423352336233723382339234023412342234323442345234623472348234923502351235223532354235523562357235823592360236123622363236423652366236723682369237023712372237323742375237623772378237923802381238223832384238523862387238823892390239123922393239423952396239723982399240024012402240324042405240624072408240924102411241224132414241524162417241824192420242124222423242424252426242724282429243024312432243324342435243624372438243924402441244224432444244524462447244824492450245124522453245424552456245724582459246024612462246324642465246624672468246924702471247224732474247524762477247824792480248124822483248424852486248724882489249024912492249324942495249624972498249925002501250225032504250525062507250825092510251125122513251425152516251725182519252025212522252325242525252625272528252925302531253225332534253525362537253825392540254125422543254425452546254725482549255025512552255325542555255625572558255925602561256225632564256525662567256825692570257125722573257425752576257725782579258025812582258325842585258625872588258925902591259225932594259525962597259825992600260126022603260426052606260726082609261026112612261326142615261626172618261926202621262226232624262526262627262826292630263126322633263426352636263726382639264026412642264326442645264626472648264926502651265226532654265526562657265826592660266126622663266426652666266726682669267026712672267326742675267626772678267926802681268226832684268526862687268826892690269126922693269426952696269726982699270027012702270327042705270627072708270927102711271227132714271527162717271827192720272127222723272427252726272727282729273027312732273327342735273627372738273927402741274227432744274527462747274827492750275127522753275427552756275727582759276027612762276327642765276627672768276927702771277227732774277527762777277827792780278127822783278427852786278727882789279027912792279327942795279627972798279928002801280228032804280528062807280828092810281128122813281428152816281728182819282028212822282328242825282628272828282928302831283228332834283528362837283828392840284128422843284428452846284728482849285028512852285328542855285628572858285928602861286228632864286528662867286828692870287128722873287428752876287728782879288028812882288328842885288628872888288928902891289228932894289528962897289828992900290129022903290429052906290729082909291029112912291329142915291629172918291929202921292229232924292529262927292829292930293129322933293429352936293729382939294029412942294329442945294629472948294929502951295229532954295529562957295829592960296129622963296429652966296729682969297029712972297329742975297629772978297929802981298229832984298529862987298829892990299129922993299429952996299729982999300030013002300330043005300630073008300930103011301230133014301530163017301830193020302130223023302430253026302730283029303030313032303330343035303630373038303930403041304230433044304530463047304830493050305130523053305430553056305730583059306030613062306330643065306630673068306930703071307230733074307530763077307830793080308130823083308430853086308730883089309030913092309330943095309630973098